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Control in a behavioral context

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Notation

Symbol	Short description	Page
\mathbb{Z}_+	set of non-negative integers	
\mathbb{R}	set of real numbers	10
\mathbb{R}_+	set of nonnegative real numbers	
\mathbb{R}_-	set of nonpositive real numbers	
\mathbb{C}	set of complex numbers	11
\mathbb{C}^-	set of complex numbers with negative real part	11
$\overline{\mathbb{C}^+}$	set of complex numbers with nonnegative real part	11
σ, σ^t	shift-operator	16
$\mathbb{W}^{\mathbb{T}}$	set of maps $\mathbb{T} \rightarrow \mathbb{W}$	14
$\mathfrak{C}^\infty(\mathbb{R}, \mathbb{R}^w)$	set of infinitely differentiable functions $\mathbb{R} \rightarrow \mathbb{R}^w$	10
$\mathfrak{D}(\mathbb{R}, \mathbb{R}^w)$	set of infinitely differentiable functions with compact support	18
$\mathcal{L}_1^{\text{loc}}(\mathbb{R}, \mathbb{R}^w)$	set of locally integrable functions	18
$\mathcal{L}_2(\mathbb{R}, \mathbb{R}^w)$	set of functions square integrable on \mathbb{R}	136
$\deg M$	degree of one variable or two variable polynomial matrix M	10,12
\det	determinant	
$P^{(k)}(\xi)$	k^{th} formal derivative of the polynomial matrix $P(\xi)$	30
$\binom{j}{\ell}$	Binomial coefficient	11
Im	image of linear map	28
\ker	kernel of linear map	
$A \subseteq B$	the set A is contained in, and possibly equal to, the set B	
$A \subsetneq B$	the set A is properly contained in the set B	
$I_{\mathbf{n}}$	the identity matrix of size \mathbf{n} by \mathbf{n}	10
$0_{\mathbf{n}_1 \times \mathbf{n}_2}$	the zero matrix with \mathbf{n}_1 rows and \mathbf{n}_2 columns	10
$\text{coldim}(M)$	the column dimension of the matrix M	10
$\text{rowdim}(M)$	the row dimension of the matrix M	10
$\dim(M)$	size of a square matrix M or number of components in vector M	10

Symbol	Short description	Page
$\text{rank}(M)$	the rank of M (more at index: rank)	11
$\text{sign}(M)$	the signature of M (more at index: signature)	99
$\text{Re}(\lambda)$	the real part of $\lambda \in \mathbb{C}$	
$\bar{\lambda}$	the complex conjugate of $\lambda \in \mathbb{C}$	137
A^T	the transpose of the matrix A	
$\text{col}(A_1, A_2)$	$[A_1^T \ A_2^T]^T$	10
$\text{diag}(r_1, r_2)$	the diagonal matrix constructed from r_1 and r_2	10
\mathbf{w}	number of components in the vector valued w , i.e. $\mathbf{w} = \dim(w)$	10
$\mathcal{L}^{\mathbf{w}}$	the set of linear differential systems	17
$\mathcal{L}_{\text{cont}}^{\mathbf{w}}$	the set of controllable linear differential systems	28
\mathfrak{B}	a behavior	14
$\mathbf{w}(\mathfrak{B})$	the number of components, i.e. $\dim(w)$, of an element w in \mathfrak{B}	34
$\mathbf{m}(\mathfrak{B})$	the input cardinality of \mathfrak{B}	32
$\mathbf{p}(\mathfrak{B})$	the output cardinality of \mathfrak{B}	32
$\mathbf{n}(\mathfrak{B})$	the McMillan degree of \mathfrak{B}	92
$\Pi_w(\mathfrak{B})$	the projection of \mathfrak{B} to a subset w of its variables	20
$\mathcal{N}_w(\mathfrak{B})$	the behavior that is hidden from the variables other than w	46
$\mathfrak{B}_{\text{cont}}$	the controllable part of behavior \mathfrak{B}	35
\mathfrak{B}^\perp	the orthogonal complement of a controllable behavior \mathfrak{B}	
$\chi_{\mathfrak{B}}$	characteristic polynomial of an autonomous behavior \mathfrak{B}	30
$\mathbb{R}[\xi]$	set of polynomials with real coefficients in one indeterminate ξ	10
$\mathbb{R}^{\mathbf{n}_1 \times \mathbf{n}_2}[\xi]$	set of real polynomial matrices with \mathbf{n}_1 rows and \mathbf{n}_2 columns	10
$\mathbb{R}^{\bullet \times \mathbf{n}}[\xi]$	set of real polynomial matrices with \mathbf{n} columns	10
$\mathbb{R}^{\mathbf{p} \times \mathbf{m}}(s)$	set of real rational matrices of size $\mathbf{p} \times \mathbf{m}$	
$\mathbb{R}[\zeta, \eta]$	set of polynomials in two indeterminates ζ and η	12
∂	operates on $\Phi \in \mathbb{R}^{\mathbf{w} \times \mathbf{w}}[\zeta, \eta]$ by $\partial\Phi(\xi) := \Phi(-\xi, \xi)$	107
\bullet	operates on $\Phi \in \mathbb{R}^{\mathbf{w} \times \mathbf{w}}[\zeta, \eta]$ by $\dot{\Phi}(\zeta, \eta) := (\zeta + \eta)\Phi(\zeta, \eta)$	107
$\text{mat}(R)$	the coefficient matrix of one or two variable polynomial matrix R	90,99
$\ G\ _{\mathcal{H}_\infty}$	the \mathcal{H}_∞ norm of $G \in \mathbb{R}^{\mathbf{p} \times \mathbf{m}}(s)$	
Σ	dynamical system (page 14), signature matrix (page 98), supply rate (page 117)	